

## **Appendix E – Waste Load Allocation**



MATTHEW G. BEVIN  
GOVERNOR

**ENERGY AND ENVIRONMENT CABINET  
DEPARTMENT FOR ENVIRONMENTAL PROTECTION**

300 SOWER BOULEVARD  
FRANKFORT, KENTUCKY 40601

CHARLES G. SNAVELY  
SECRETARY

ANTHONY R. HATTON  
COMMISSIONER

June 13, 2019

David F. Schrader P.E.  
Bell Engineering  
2480 Fortune Drive  
Suite 350  
Lexington, KY 40509

Re: Wasteload Allocation Rerate Request  
KPDES No.: KY0104400  
AI NO: 15797  
Mt. Sterling Hinkson Creek WWTP  
Montgomery County, Kentucky

Dear Mr. MacIndoe:

This is in response to your May 31, 2019 letter (attached), requesting preliminary limits for the construction of the subject wastewater treatment plant (WWTP) located at National Hydrography Dataset (NHD) River Mile (RM) 64.9 of Hinkson Creek (38.084806 N, 83.922444 W (based on depicted location on attached map)) with a design capacity increasing from 3 MGD to 6 MGD. This increase is required to better serve the community, which has seen an increase in activity.

Considering the above-mentioned information, applicable effluent limitations are provided below.

Design Capacity = 6.0 MGD / Near NHD RM 64.9 of Hinkson Creek

<u>Parameter</u>	<u>May 1 – October 31</u>	<u>November 1 - April 30</u>
CBOD <sub>5</sub>	10 mg/l	10 mg/l
Total Suspended Solids	30 mg/l	30 mg/l
Ammonia Nitrogen	4 mg/l	10 mg/l
Dissolved Oxygen	7 mg/l	7 mg/l
Total Residual Chlorine	0.011 mg/l	0.011 mg/l

Reliability Classification = Grade C

In addition to the above limits, the monthly average and maximum weekly average values of *Escherichia coli* shall be at or below 130 colonies per 100 milliliters or 240 colonies per 100 milliliters, respectively, the year around. If a form of chlorine is proposed to disinfect the wastewater, then de-chlorination will likely be needed to achieve the chlorine residual effluent concentration. Additional effluent limitations and water quality standards are contained in 401 KAR Chapter 5 and 401 KAR Chapter 10.



MATTHEW G. BEVIN  
GOVERNOR

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Mr. David F. Schrader, P.E.  
Bell Engineering  
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These preliminary design effluent limitations are valid for one (1) year from the date of this letter, and are subject to change as a result of additional information which may be presented during the public notice phase of the Kentucky Pollutant Discharge Elimination System (KPDES) permitting process. As such, this letter does not convey any authorization or approval to proceed with the construction or operation of the proposed WWTP. Construction and KPDES permit applications must be submitted to request such authorization or approval. Nor does this letter ensure issuance of either permit. During the review processes of these permits the Division of Water will further evaluate the viability of the project.

Should you have any questions regarding this letter, please contact me at (502) 782-6946 or E-mail at Matthew.Fields@ky.gov.

Sincerely,  
*Matthew Fields*

Matthew Fields  
WLA Coordinator  
Surface Water Permits Branch  
Division of Water

TP: MF

c: Compliance and Technical Assistance  
Daniel Fraley, Morehead Regional Office  
ARM



RECEIVED

JUN - 5 2019

SWPB

May 31, 2019

Todd Powers  
Energy and Environment Cabinet  
Division of Water  
300 Sower Boulevard  
Frankfort, KY 40601

Re: Wastewater Treatment Facilities  
Mount Sterling Water & Sewer Commission  
Mount Sterling, Kentucky

Mr. Powers:

The Mount Sterling Water and Sewer System (MSWSS) is planning the upgrade of the Hinkston Creek wastewater treatment plant (KY0104400). The existing discharge located at Latitude, 38.084806° (N), Longitude, -83.922444° (W) will not change. On behalf of MSWSS, we respectfully request to increase the effluent at this discharge location from the currently permitted 3.0 million gallons per day (mgd) to 6.0 mgd. A pre-planning meeting was conducted on May 15<sup>th</sup>, 2019 to discuss the potential for re-rating the existing facility and expanding the capacity. Attached is a copy of the sign-in sheet from that meeting.

Thank you for a timely response as we are on a tight schedule to design these facilities. If you have any questions or need additional information, please call me.

Sincerely,  
Bell Engineering

A handwritten signature in black ink, appearing to read "D. F. Schrader".

David F. Schrader, P.E.  
Project Manager

c: Rick Fletcher, General Manager MSWSS  
Chris Maloney, WWTP Superintendent MSWSS

Attachment

## **Appendix F – WWTP Process Equipment Proposals**

**Ovivo USA, LLC**

4246 Riverboat Road, Suite 300  
Salt Lake City, Utah  
84123 USA  
USA

Telephone: 801-931-3076  
Facsimile: 801-931-3090  
[www.ovivowater.com](http://www.ovivowater.com)



May 22, 2018

To: David Schrader, P.E.  
Vice President  
Bell Engineering  
2480 Fortune Drive Suite 350  
Lexington, KY 40509  
[dschrader@hkbell.com](mailto:dschrader@hkbell.com)

Subject: Hinkston Creek Carrousel Plant Capacity  
Mt Sterling, KY

David,

We have evaluated the capacity of the existing Hinkston Creek two train A2C Carrousel facility given the revised design basis. The volumes of the existing tanks and current equipment sizing is as follows:

Biological Volumes:

Aerobic volume: 1.4 MG/train; 2.8 MG total (2 @ 60 HP aerators per train, 4 total)  
Anoxic volume: 0.27 MG/train; 0.54 MG total  
Anaerobic volume: 0.062 MG/train, 0.12 MG total

Influent Design Basis:

BOD - 300 mg/l  
TSS - 400 mg/l  
NH3-N – 20 mg/L (45 mg/L TKN assumed)  
TP - 10 mg/l

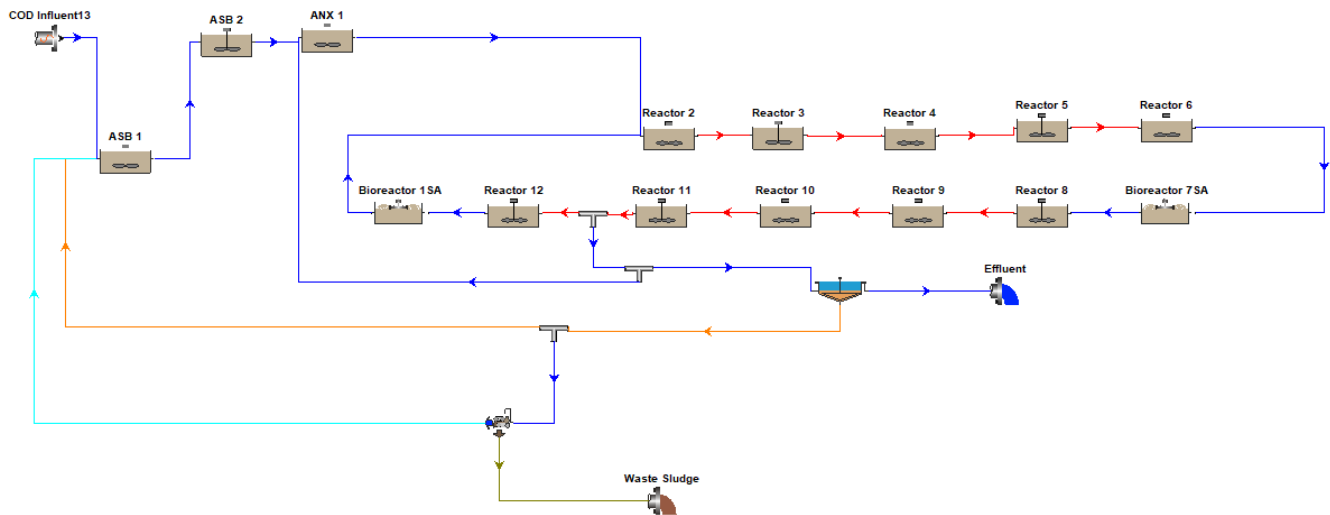
It is desired to reduce TP to as low as possible biologically.

We evaluated the effluent at 3.0 – 6.0 MGD (total plant flow going to two trains) in 0.5 MGD increments using a Biowin steady-state model. Our model is slightly different than yours in that we considered that the aerobic volume is higher in the outer loop than it is in the inner loop. We maintained a DO of approximately 0.2 mg/L in the most downstream reactor. This DO profile is typical of Carrousel facilities with automated aeration control to promote the maximum level of denitrification. We also held the MLSS at approximately 4,500 mg/L.

All Biowin parameters were left at default except for the following:

- OHO DO half sat. – 0.25
- Anaerobic Hydrolysis Factor – 0.25
- Particulate inert COD:VSS ratio – 1.2

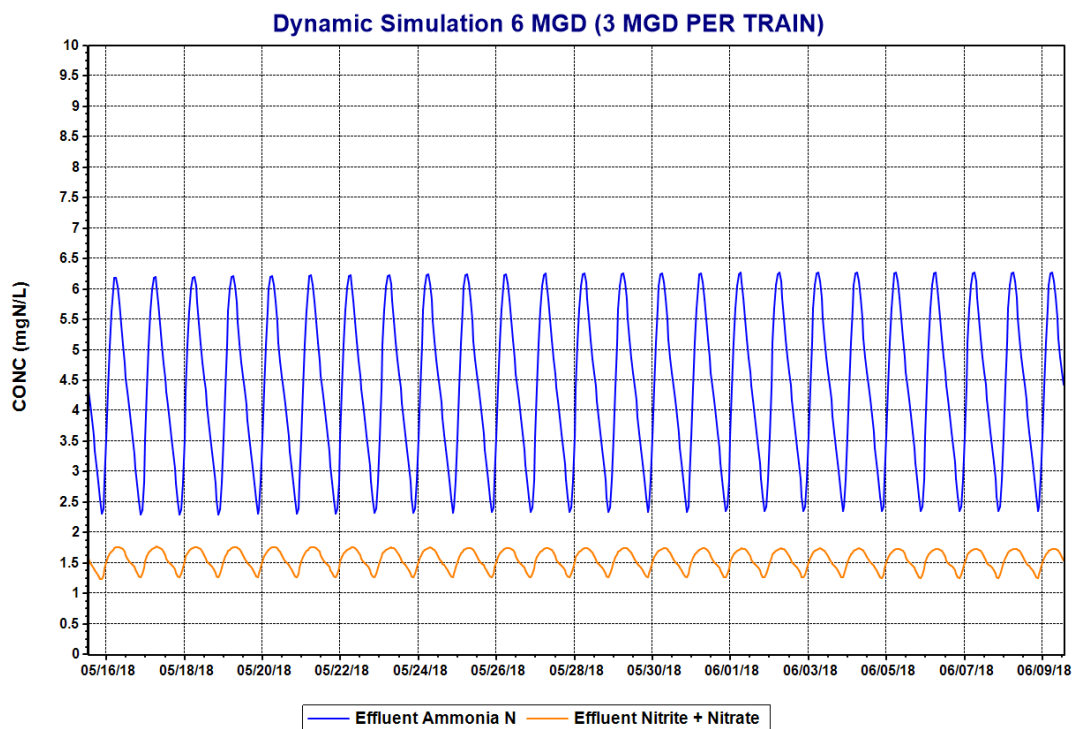
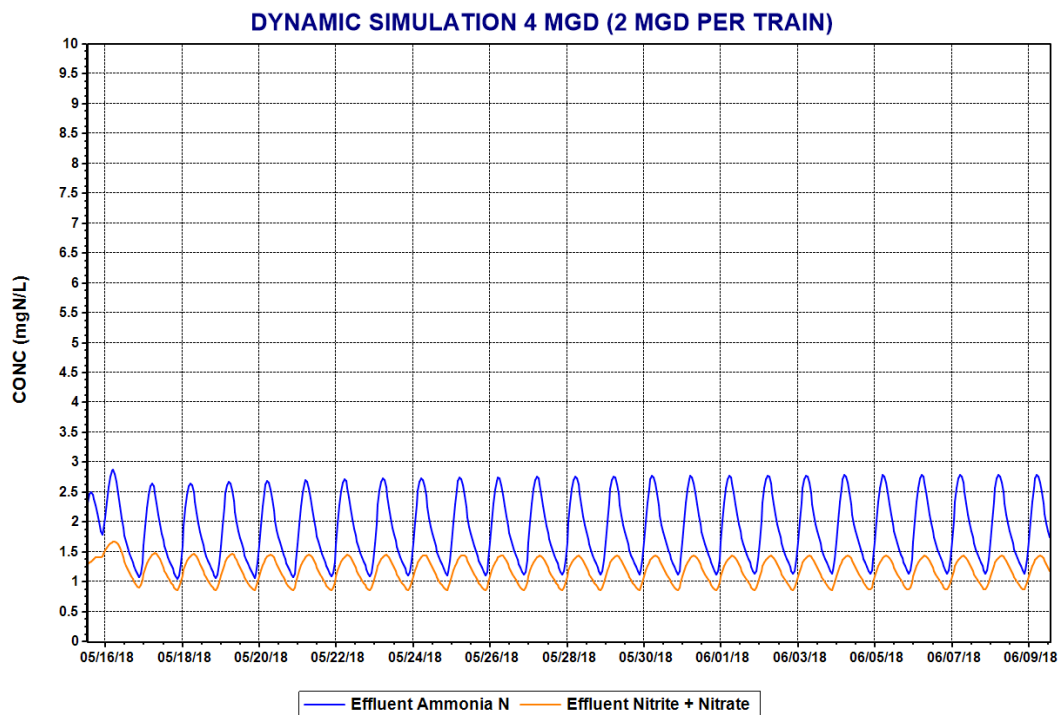
A snapshot of the Biowin model is below.



The results of the steady state model are as follows:

Flow	3.0 MGD	3.5 MGD	4.0 MGD	4.5 MGD	5.0 MGD	5.5 MGD	6.0 MGD
<b>Aerobic Volume/train(MG)</b>	1.4	1.4	1.4	1.4	1.4	1.4	1.4
<b>MLSS (mg/l)</b>	4504	4502	4500	4503	4500	4503	4505
<b>Total Wasting (lb/d)</b>	3435	4111	4803	5515	6249	6994	7744
<b>SRT (d)</b>	15.3	12.8	10.9	9.5	8.4	7.5	6.8
<b>DO in Reac. 6 (mg/l)</b>	0.21	0.20	0.22	0.21	0.20	0.20	0.20
<b>DO in Reac. 12 (mg/l)</b>	0.70	0.71	0.71	0.71	0.70	0.70	0.70
<b>DO in Reac. 7SA (mg/l)</b>	1.45	1.55	1.68	1.70	1.80	1.88	1.92
<b>DO in Reac. 1SA (mg/l)</b>	1.78	2.00	2.40	2.45	2.65	2.85	3.05
<b>EFF. NH3-N (mg/l)</b>	0.87	1.00	1.16	1.36	1.65	2.01	2.46
<b>EFF. NO3-N (mg/l)</b>	0.42	0.44	0.48	0.22	0.22	0.10	0.04
<b>EFF. NO2-N (mg/l)</b>	0.36	0.46	0.58	0.75	1.11	1.38	1.31
<b>EFF. TP (mg/l)</b>	0.59	0.51	0.46	0.42	0.37	0.35	0.35

We also ran a dynamic model at 4.0 and 6.0 MGD (total plant flow combined to two trains). In this exercise, we simulated a diurnal influent pattern and looked at the effluent diurnal pattern for N species. A snapshot of the effluent N species over a 25 day period at each of these flow rates is shown in the figures below.





We believe, based on the modeling, that the plant should be rated at 4.0 MGD (2.0 MGD per train). We believe that this provides sufficient safety factor for the facility to completely nitrify while achieving high levels of denitrification and bio-P removal year-round. Note that this is a loading rate of 26.4 lb BOD/kft<sup>3</sup>/day (based on aerobic volume), and this is generally acceptable for activated sludge systems in your climate.

We also ran our standard calculations for SRT and aeration requirements. Note that the main two differences between our model and the Biowin model are (1) the higher MLSS for the same SRT (due to the higher yield we consider in our standard model), and (2) the higher aeration HP requirement (due to the higher oxygen coefficient that we consider. Based on these calculations, and given the apparent highly variable daily influent loading at this facility, we recommend the aerators be upgraded to 100 HP.

We believe that the design MLSS should be 4,500 mg/L with a wasting of 10,000 lb/day TSS for a 4 MGD flow (2 MGD/train). Due to the current highly variable loading and real-world operating conditions, we recommend 5,000 mg/L MLSS be used for clarifier design.

Although, both the Biowin steady-state and dynamic modeling show effluent NH<sub>3</sub>-N above 1 mg/L for the 4 MGD flow, we are confident that effluent ammonia will be maintained below 1 mg/L. It is an artifact of the model that we cannot achieve calculated effluent ammonia equal to observations in Carrousel Systems.

A third identical train may be built, with 2 @ 100 HP aerators, to expand the plant to 6.0 MGD.

A budgetary estimate for upgrading the existing four aerators to 100 HP, and the budgetary estimate for a third complete train are included in this document. The Biowin and Ovivo standard process calculations are also included in this document.

Ovivo appreciates the opportunity to assist with this project. Please feel free to call me at (801) 931-3242.

Sincerely,

Dharni Lahewala  
Carrousel Product Manager

Tom Leland, P.E.  
Aeration Process Group Manager

## Scope of Supply:

### For Retrofitting Existing Trains

- Qty 4 - 100HP Excell Aerator II w/ Excell Velocity Enhancer (EVE)
- Single speed 1800 motor, 460 V/60Hz/3 Ph, Inverter duty, 1.15 SF on sine wave power, TEFC.
  - Motor includes thermostats and space heater.
  - Reducer w/ minimum 2.5 SF, Mechanical Oil Pump, Low oil Pressure switch.
  - A36 Impellers, shaft, mounting, Zinc Plated Jackstuds.
- Qty 4 - 100 HP VFD(s), 6-pulse, 115 VAC control power transformer
- Not included: Harmonic, DV/dT filters, Bypass, Load reactor, surge Suppressor.
  - Ethernet communication module and 115v for control interface.
  - Configurable isolated I/O, digital Operator Interface modula w/LCD digital display.
- Qty 1 - Control System Type: Oculus w/ VFD, dedicated 480V/3 Ph/60 Hz feed.
- NEMA 1 MCC, installed in climate-controlled building.
  - PLC is a CompactLogix.
  - HMI is a 15in Windows HMI.
  - (4) DO Analyzer w/ (1) Probe(s)
  - (2) ORP Analyzer w/ (1) Probe(s)
  - (1) Water Expert App
- Qty 2 - EliminatIR Gate retrofit, End Pivot design - reuse existing wetted parts.
- Electric Actuator drive, 90-degree total travel.
  - A36 Stl Stand, A36 Stl Shaft, A36 Stl Gate, 304 SS Assembly bolts, 304 SS Anchors.
  - Surface Finish: SSPC-SP-10, one shop coat of Tnemec 161-1211 3-5 mils D.F.T.

Budgetary Estimate For Above.....\$905,000

## Scope of Supply:

### For New Train

- Qty 2 - 100HP Excell Aerator II w/ Excell Velocity Enhancer (EVE)
- Single speed 1800 motor, 460 V/60Hz/3 Ph, Inverter duty, 1.15 SF on sine wave power, TEFC.
  - Motor includes thermostats and space heater.
  - Reducer w/ minimum 2.5 SF, Mechanical Oil Pump, Low oil Pressure switch.
  - A36 Impellers, shaft, mounting, Zinc Plated Jackstuds.
- Qty 2 - 100 HP VFD(s), 6-pulse, 115 VAC control power transformer
- Not included: Harmonic, DV/dT filters, Bypass, Load reactor, surge Suppressor.
  - Ethernet communication module and 115v for control interface.
  - Configurable isolated I/O, digital Operator Interface modula w/LCD digital display.
- Qty 2 - 3.22 HP Submerged Turbine mixer for Anaerobic Basin.
- Single speed motor, 460 V/60 Hz/ 3 ph, Inverter duty, 1.15 SF.
  - Motor includes thermostats and space heater.
  - Parallel, helical-bevel Reducer w/ minimum 2.5 SF, splash lubrication, Low oil level switch.
  - A36 mounting plate, shaft and impeller, zinc plated steel mounting stud.
  - A36 STL Baffles, 304 SS Anchors.
- Qty 1 - 11.1 HP Submerged Turbine mixer for Anoxic Basin.
- Single speed motor, 460 V/60 Hz/ 3 ph, Inverter duty, 1.15 SF.
  - Motor includes thermostats and space heater.
  - Parallel, helical-bevel Reducer w/ minimum 2.5 SF, splash lubrication, Low oil level switch.
  - A36 mounting plate, shaft and impeller, zinc plated steel mounting stud.
  - A36 STL Baffles, 304 SS Anchors.
- Qty 1 - EliminatIR Gate, Center Pivot design.
- Electric Actuator drive, 90-degree total travel.
  - A36 Stl Stand, A36 Stl Shaft, A36 Stl Gate, 304 SS Assembly bolts, 304 SS Anchors.
  - Surface Finish: SSPC-SP-10, one shop coat of Tnemec 161-1211 3-5 mils D.F.T.

Budgetary Estimate For Above.....\$620,000

## Design Summary

### Design Basis

The A2C Carrousel system described in this proposal has been designed to treat an influent wastewater flow of **2.0 MGD per train** with the following wastewater characteristics, in a flow sheet with no primary clarification.

Parameter	Influent	Effluent	Notes
Flow (MGD)	2.000	-	
BOD – Biochemical Oxygen Demand (mg/L)	300	10	
TSS – Total Suspended Solids (mg/L)	400	10	
TKN – Total Kjeldahl Nitrogen (mg/L)	45	2.0	
NH <sub>3</sub> -N – Ammonia Nitrogen (mg/L)	-	1.0	
NO <sub>3</sub> -N – Nitrate Nitrogen (mg/L)	-	5.0	
TN – Total Nitrogen (mg/L)	-	7.0	Includes est. refractory Org-N
TP – Total Phosphorus (mg/L)	10	1.0	May require chemical polishing

### Design Criteria

Design Parameter	Design Value
Process SRT – Nitrification (days)	12.0
Minimum Wastewater Temperature (°C)	10.0
Maximum Wastewater Temperature (°C)	25.0
MLSS Concentration (mg/L)	5,000
Net Yield (lb TSS/lb BOD <sub>removed</sub> )	1.02
Oxygen Coefficient	
lb O <sub>2</sub> / lb BOD <sub>removed</sub>	1.17
lb O <sub>2</sub> / lb N <sub>oxidized</sub>	4.60
Alpha (α)	0.91
Beta (β)	0.96
Elevation (feet above sea level)	970
Design Standard Oxygen Transfer Rate (lbs O <sub>2</sub> /motorHP/Hr)	3.60

**Aeration Power Requirement**      = 141 HP without accounting for denitrification  
    = 121 HP with denitrification credit

**Aeration Power Proposed**                = 2 units at 100 HP each = 200 HP Total

## Calculations for Biological Basins

### 1. DESIGN CONDITIONS

Design Parameter	Design Value	Design Effluent	Notes
Flow (MGD)	2.0	-	
BOD – Biochemical Oxygen Demand (mg/L)	300	10	
TSS – Total Suspended Solids (mg/L)	400	10	
TKN – Total Kjeldahl Nitrogen (mg/L)	45	2.0	
NH <sub>3</sub> -N – Ammonia Nitrogen (mg/L)	-	1.0	
NO <sub>3</sub> -N – Nitrate Nitrogen (mg/L)	-	5.0	
TN – Total Nitrogen (mg/L)	-	7.0	Includes estimated refractory organic nitrogen
TP – Total Phosphorus (mg/L)	10	1.0	May require chemical polishing and effluent filtration

### 2. DESIGN ASSUMPTIONS

Design Parameter	Design Value
Process SRT – Nitrification (days)	12.0
Minimum Wastewater Temperature (°C)	10.0
Maximum Wastewater Temperature (°C)	25.0
MLSS Concentration (mg/L)	5,000
Net Yield (lb TSS/lb BOD <sub>removed</sub> )	1.02
Oxygen Coefficient	
lb O <sub>2</sub> / lb BOD <sub>removed</sub>	1.17
lb O <sub>2</sub> / lb N <sub>oxidized</sub>	4.60
Alpha (α)	0.91
Beta (β)	0.96
Elevation (feet above sea level)	970

### 3. PROCESS CALCULATIONS

#### a. AERATION VOLUME

$$\begin{aligned}\text{BOD Removal} &= Q \times (\text{BOD}_{\text{in}} - \text{BOD}_{\text{eff}}) \times 8.34 \\ &= 2.000 \times (300 - 10) \times 8.34 \\ &= 4,837 \text{ lbs BOD/day}\end{aligned}$$

$$\begin{aligned}\text{Sludge Production} &= Y \times Q \times (\text{BOD}_{\text{in}} - \text{BOD}_{\text{eff}}) \times 8.34 \\ &= 1.02 \times 2.000 \times (300 - 10) \times 8.34 \\ &= 4,924 \text{ lbs TSS/day}\end{aligned}$$

$$\begin{aligned}\text{System Mass} &= \text{SRT} \times Y \times Q \times (\text{BOD}_{\text{in}} - \text{BOD}_{\text{eff}}) \times 8.34 \\ &= 12.0 \times 1.02 \times 2.000 \times (300 - 10) \times 8.34 \\ &= 59,091 \text{ lbs TSS}\end{aligned}$$

$$\begin{aligned}\text{Carrousel Volume} &= \frac{\text{SRT} \times Y \times Q \times (\text{BOD}_{\text{in}} - \text{BOD}_{\text{eff}})}{\text{MLSS}} \\ &= \frac{12.0 \times 1.02 \times 2.000 \times (300 - 10)}{5,000} \\ &= 1.417 \text{ M. G.}\end{aligned}$$

$$\begin{aligned}\text{BOD loading per 1000ft}^3 \text{ aer. vol.} &= \frac{Q \times \text{BOD}_{\text{in}} \times 8.34 \times 7.481 \times 1,000}{\text{Carrousel Volume} \times 10,00,000} \\ &= \frac{2.000 \times 300 \times 8.34 \times 7.481 \times 1000}{1.417 \times 1000000} \\ &= 26.4 \text{ lb BOD/kft}^3/\text{day}\end{aligned}$$

**b. AERATION POWER**

$$\text{Nitrogen Synthesis} = 5.6\% \text{ of WAS}$$

$$= 16.4 \text{ mg/L}$$

$$\text{Nitrogen Oxidized (N}_{\text{ox}}) = \text{TKN}_{\text{in}} - \text{TKN}_{\text{eff}} - \text{N}_{\text{assimilation}}$$

$$= 45 - 2.0 - 16.4$$

$$= 26.6 \text{ mg/L}$$

$$= 443 \text{ lbs} \cdot \text{N/day}$$

$$\text{Actual Oxygen Requirement @ } 1.17 \text{ lbs O}_2/\text{lbs BOD}_{\text{removed}} \text{ \& } 4.60 \text{ lbs O}_2/\text{lbs N}_{\text{oxidized}}$$

$$\text{AOR} = (1.17 \times 4,837) + (4.60 \times 443)$$

$$= 7,689 \text{ lbs O}_2/\text{day}$$

$$\text{STD O}_2\text{Requirement} = \text{AOR} \times \frac{9.02}{\alpha \times (\beta \times C_{\text{SW}} - C_0)} \times 1.024^{(20 - T_{\text{MAX}})}$$

$$\alpha = 0.91 \quad \beta = 0.96 \quad C_0 = 2.0$$

$$C_{\text{SW}} \text{ at } 25.0^\circ\text{C and 970 feet elevation} = 7.88 \text{ mg/L O}_2$$

$$\text{SOR} = 7,689 \times \frac{9.02}{0.91 \times (0.96 \times 7.88 - 2.0)} \times 1.024^{(20 - 25.0)}$$

$$= 12,154 \text{ lbs O}_2/\text{day}$$

$$\text{Power Required} = \frac{12,154}{3.60 \times 24}$$

$$= 141 \text{ HP } 2 @ 100.0 \text{ HP} = 200 \text{ HP Installed}$$

Calculations

Hinkston Creek

Denitrification Credit @  $2.86 \frac{\text{lbs O}_2}{\text{lbs NO}_3\text{-N}_{\text{reduced}}}$

$$\text{lbs NO}_3\text{-N}_{\text{reduced}} = (\text{TKN}_{\text{in}} - \text{TKN}_{\text{eff}} - \text{N}_{\text{assimilation}} - \text{NO}_3\text{-N}_{\text{eff}}) \times Q \times 8.34$$

$$= (45 - 2.0 - 16.4 - 5.0) \times 2.000 \times 8.34$$

$$= 360 \text{ lbs/day}$$

$$\text{O}_2\text{Credit} = 2.86 \times (\text{lbs NO}_3 - \text{N}_{\text{reduced}})$$

$$= 1,029 \text{ lbs O}_2/\text{day}$$

$$\text{SOR Credit} = \text{O}_2\text{Credit} \times \frac{9.02}{\alpha(\beta \times C_{\text{SW}} - C_0)} \times 1.024^{(20 - T_{\text{MAX}})}$$

$$= \frac{1,627}{3.60 \times 24}$$

$$\text{Horsepower Credit} = (19 \text{ HP})$$



**c. ANOXIC VOLUME (A<sup>2</sup>C)**

$$\begin{aligned} \text{NO}_3\text{-N Reduced in Carrousel Basin} \quad & \left(\frac{\text{mg}}{\text{L}}\right) = \text{Not Considered} \\ & \left(\frac{\text{lbs}}{\text{day}}\right) = \text{Not Considered} \end{aligned}$$

$$\text{Active Biomass} = 4000 \text{ mg VSS/L}$$

$$\text{Specific Denitrification Rate SDNR} = 0.0323 \text{ gNO}_3\text{-N/gVSS} \cdot \text{day}$$

$$\begin{aligned} \text{lb NO}_3\text{-N}_{\text{reduced in Anoxic Basin}} &= [\text{NO}_{\text{OX}} - (\text{N}_{\text{reduced in Carrousel}})] \times \frac{\text{IR}/Q}{(1 + \text{IR}/Q + Q_{\text{RAS}}/Q)} \\ &= (443 - 0) \times \frac{3.6}{1 + 3.6 + 0.75} \\ &= 297 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{Anoxic Volume} &= \frac{\text{lb NO}_3\text{-N}_{\text{reduced}}}{\text{SDNR} \times \text{MLVSS} \times 8.34} \\ &= \frac{297}{0.0323 \times 4000 \times 8.34} \\ &= 0.276 \text{ M. G.} \end{aligned}$$

**d. ANAEROBIC VOLUME (A<sup>2</sup>C)**

$$\begin{aligned}\text{Anaerobic Volume} &= \frac{\text{HDT} \times Q}{24} && (\text{HDT in hours; } Q \text{ in MGD}) \\ &= \frac{1.5 \times 2.000}{24} \\ &= 0.125 \text{ M. G.}\end{aligned}$$

$$\begin{aligned}\text{NO}_3\text{-N}_{\text{Removed from RAS}} &= (Q_{\text{RAS}}/Q) \times \text{NO}_3\text{-N}_{\text{eff}} \times 8.34 \\ &= 0.75 \times 2.000 \times 5.0 \times 8.34 \\ &= 63.00 \text{ lbs/day}\end{aligned}$$



# MOUNT STERLING HINKSTON CREEK, KY

Design, Supply and Instalation Inspection  
BioPortz Wastewater Treatmen System

February 4, 2020

BiOP<sub>ORTZ</sub>™

# Project Overview

A BioPortz™ Wastewater Treatment System is proposed for the Mount Sterling Hinkston WWTP, KY. The process would consist of the following:

- Upgrade existing screens to fine 0.25" two-dimensional screens (by others)
- Retain existing anaerobic tankage and mixing
- Retain existing anoxic tankage and mixing
- Convert the oxidation ditch tankage to complete mix aerated tank and deoxygenation (DeOx) zone – draft proposed layout in attached drawings (by others)
- Implement BioPotrz IFAS system in the aerobic tankage
- Implement internal sludge recycle from the DeOx zone to the Anoxic zone (by others)

The implementation of BioPortz IFAS system will allow to expand the capacity of the plant to 6 mgd without additional tankage.

## Treatment Design Criteria

	Units	Raw Sewage	Effluent
Average Flow	mgd	6	
Maximum Flow	mgd	12	
Temperature	°C	12-20	
BOD avg	mg/l	300	
TSS avg	mg/l	400	
TKN avg	mg/l	30	
Total Ammonia	mg/l		<3
TP avg	mg/l	8	<1
TN	mg/l		<10

1) Influent wastewater not characterized – typical domestic sewage characteristics were assumed.

# Equipment Process Design Parameters

A summary of the BioPortz IFAS design parameters is presented in the following table:

Parameter	Unit	IFAS	DeOx
Media volume	m <sup>3</sup>	2,524	-
Tank volume	MG	2.67	0.23
Water depth	ft	12	12
Media filling fraction	%	25	-
Effluent media retention screens		24 (24")	
Drain		flat panel screens	

A summary of the BioPortz IFAS aeration parameters is displayed in the following table:

Parameter	Units	IFAS
Alpha		0.70
Beta		0.97
Elevation	ft	902
Water depth	ft	12
Dissolved oxygen	mg/l	6.0
AOR Max	lb/d	13,925
Max airflow	scfm	29,800
Normal operating pressure	psi	6
Maximum required pressure	psi	7.2

A summary of BioPortz IFAS blower parameters is displayed in the following table:

Parameter	Units	Blowers
Quantity	qty	7
Duty / Standby	qty	6 / 1
Nameplate HP	HP	300

# Scope of Work

## GENERAL

- Nexom process design, process CAD drawings, and specifications
- Operation and maintenance manuals and project record drawings
- Shipping to site
- Installation inspection and start-up / commissioning of equipment supplied by Nexom

## BIOPORTZ™ MBBR SYSTEM

- One (1) lot of equipment to furnish two (2) BioPortz IFAS tanks
- BioPortz™ 1000 media
- 24 Media retention screens for the effluent (24")
- Prefabricated aeration grid including HDPE diffusers, HDPE laterals, HDPE floor-mounted header, and HDPE header drop-pipes
- Seven (7) 300 HP Aerzen positive displacement blowers (i.e., six duty and one standby) with control panel and VFD
- Four (4) DO sensors with local display
- Two (2) tank level switches

## CAPITAL COST FOR THE SCOPE OF WORK AS DETAILED ABOVE:

**\$ 3,888,000 USD**

All prices are subject to final design review. Taxes extra. Prices valid for 30 days.

## EXCLUSIONS

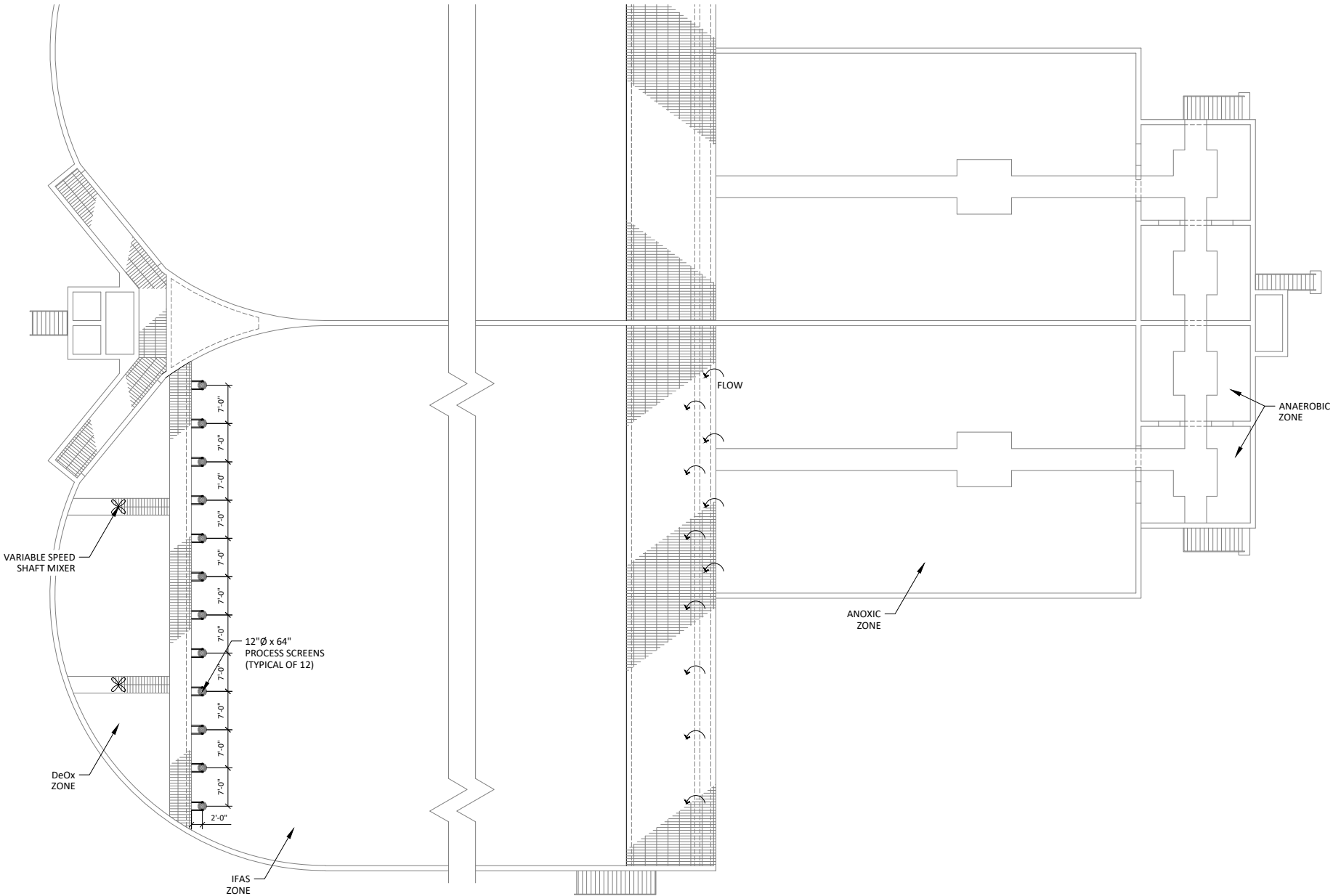
- Any process equipment not listed within the Scope of Supply
- New building works
- Material offloading, storage, and equipment installation
- Civil, mechanical, or electrical works including concrete tanks and power hookup
- Modifications to existing infrastructure
- Placement and installation of Nexom supplied equipment
- Influent, interconnecting, and / or effluent process piping / pumping
- Internal recycle piping and pumping
- DeOx zone mixers
- IFAS zone drainage flat screens
- Air supply and distribution piping from blowers to edge of process tanks
- Wiring / control wiring of all supplied components and equipment
- Master control center and / or SCADA

## Questions or comments

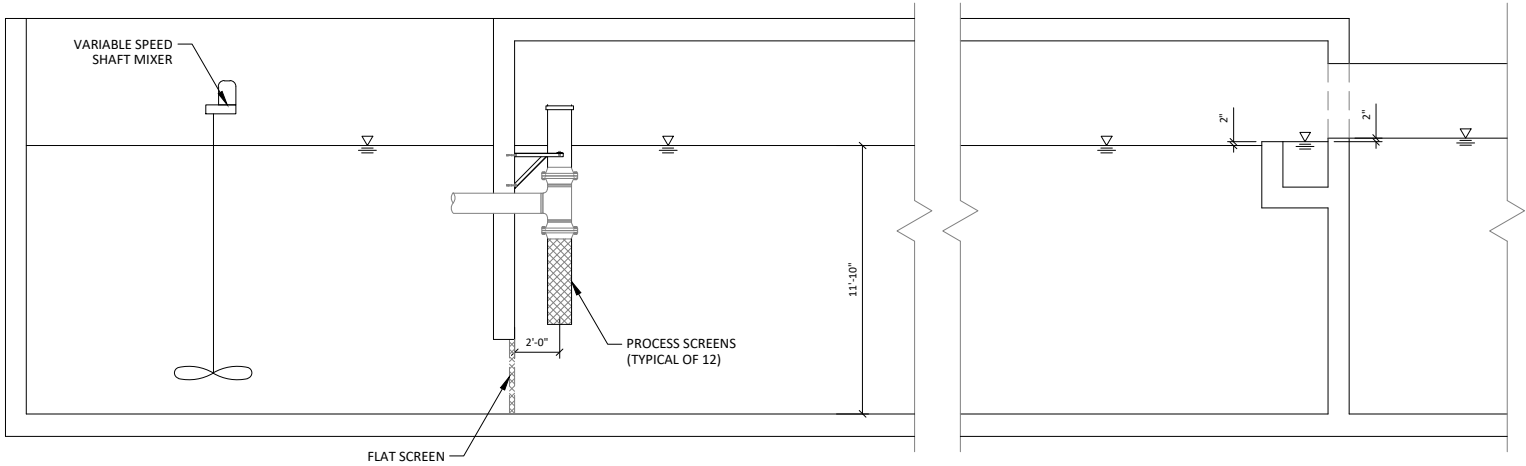
Any questions or comments can be directed to:

### Nexom

5 Burks Way  
Winnipeg MB R2J 3R8  
888-426-8180  
[www.nexom.com](http://www.nexom.com)



**AERATION LAYOUT**  
SCALE: 1:150



**TYPICAL SECTION**  
SCALE: N.T.S.



5 Burks Way  
Navin, Manitoba  
Canada R5T 0C9  
888-426-8180  
www.nexom.com

PROJECT:		MOUNT STERLING HINKSTON, KY PROPOSED WASTEWATER TREATMENT SYSTEM			
TITLE:		MBBR SYSTEM AERATION LAYOUT, TYPICAL SECTION			
DRAWN BY:	AM	APPROVED BY:	DK	SCALE:	AS NOTED
DATE:	2020/02/04	FILE #	CD4712.01	DRAWING NO.	NE01
				SHT.	1 of 1
				REV.	0



## **Appendix G - 2019 Audit**

# **Mount Sterling Water and Sewer Commission**

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**Independent Auditor's Report  
and Basic Financial Statements  
June 30, 2019 and 2018**

**Mount Sterling Water and Sewer Commission**  
**Table of Contents**  
**June 30, 2019 and 2018**

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**CERTIFIED PUBLIC ACCOUNTANTS**

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**INDEPENDENT AUDITOR'S REPORT**

Mount Sterling Water and  
Sewer Commission and  
the City Council  
Mount Sterling, Kentucky 40353

**Report on the Financial Statements**

We have audited the accompanying financial statements of the business-type activities of Mount Sterling Water and Sewer Commission (the Commission) of the City of Mount Sterling, Kentucky, as of and for the years ended June 30, 2019 and 2018, and the related notes to the financial statements, which collectively comprise the Commission's basic financial statements as listed in the table of contents.

***Management's Responsibility for the Financial Statements***

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

***Auditor's Responsibility***

Our responsibility is to express opinions on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

Mount Sterling Water and  
Sewer Commission and  
the City Council  
Mount Sterling, Kentucky 40353  
Page 2

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

### ***Opinions***

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the business-type activities of the Mount Sterling Water and Sewer Commission (the Commission) of the City of Mount Sterling, Kentucky, as June 30, 2019 and 2018, and the respective changes in financial position, and cash flows thereof for the years then ended in accordance with accounting principles generally accepted in the United States of America.

### ***Change in Accounting Principle***

As described in Note 9 to the financial statements, in 2018, the Mount Sterling Water and Sewer Commission adopted new accounting guidance, *GASB Statement No. 75, Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions*. Our opinion is not modified with respect to this matter.

### ***Other Matters***

#### ***Required Supplementary Information***

Accounting principles generally accepted in the United States of America require that the schedules of selected pension and other postemployment benefits information on pages 26 through 31 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Management has omitted the Management's Discussion & Analysis that accounting principles generally accepted in the United States of America require to be presented to supplement the basic financial statements. Such missing information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. Our opinion on the basic financial statements is not affected by this missing information.

#### ***Other Information***

Our audit was conducted for the purpose of forming opinions on the financial statements that collectively comprise the Mount Sterling Water and Sewer Commission's basic financial statements. The Schedule of

Mount Sterling Water and  
Sewer Commission and  
the City Council  
Mount Sterling, Kentucky 40353  
Page 3

Revenues, Expenses and Changes in Net Position – Budget and Actual and the Schedule of Debt Service Requirements are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The Schedule of Revenues, Expenses and Changes in Net Position – Budget and Actual and the Schedule of Debt Service Requirements are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the Schedule of Revenues, Expenses and Changes in Net Position – Budget and Actual and the Schedules of Debt Service Requirements are fairly stated in all material respects in relation to the basic financial statements as a whole.

**Other Reporting Required by *Government Auditing Standards***

In accordance with *Government Auditing Standards*, we have also issued our report dated September 10, 2019, on our consideration of the Commission's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Commission's internal control over financial reporting and compliance.

***Faulkner, King & Wenz, PSC***

September 10, 2019

**Mount Sterling Water and Sewer Commission**  
**Statements of Net Position**  
**June 30, 2019 and 2018**

<b>Assets</b>	<b>2019</b>	<b>2018</b>
<b>Current assets:</b>		
Cash and investments	\$ 7,255,496	\$ 6,423,465
Accounts receivable, net	795,234	733,561
Interest receivable	10,904	1,975
Other receivables	16,420	38,586
Inventory	203,722	179,603
Prepaid expenses	29,688	26,116
Total current assets	<u>8,311,464</u>	<u>7,403,306</u>
<b>Non-current assets:</b>		
Restricted cash and cash equivalents	715,929	685,102
Capital Assets:		
Land and building	1,790,582	1,773,582
Water and sewer system	61,456,245	61,007,304
Equipment	1,538,542	1,559,303
Vehicles	449,373	424,427
Construction in progress	374,710	0
Less accumulated depreciation	<u>(37,420,831)</u>	<u>(35,597,138)</u>
Total non-current assets	<u>28,904,550</u>	<u>29,852,580</u>
<b>Deferred Outflows of Resources</b>		
Deferred outflows - pension	676,601	870,556
Deferred outflows - OPEB	284,660	316,533
Total deferred outflows	<u>961,261</u>	<u>1,187,089</u>
Total assets and deferred outflows of resources	<u>\$ 38,177,275</u>	<u>\$ 38,442,975</u>
<b>Liabilities</b>		
<b>Current liabilities:</b>		
Accounts payable	\$ 124,936	\$ 95,793
Other accrued liabilities	357,866	344,161
Accrued interest on bonds	2,681	3,201
Customer deposits	387,030	356,372
Implicit subsidy for OPEB	15,661	13,453
Notes payable	630,614	624,355
Total current liabilities	<u>1,518,788</u>	<u>1,437,335</u>
<b>Non-current liabilities:</b>		
Notes payable	2,586,313	3,216,927
Net pension liability	3,329,935	3,205,037
Net OPEB liability	970,797	1,100,783
Total non-current liabilities	<u>6,887,045</u>	<u>7,522,747</u>
Total liabilities	<u>8,405,833</u>	<u>8,960,082</u>
<b>Deferred Inflows of Resources</b>		
Deferred inflows - pension	139,951	162,795
Deferred inflows - OPEB	200,878	57,633
Total deferred inflows	<u>340,829</u>	<u>220,428</u>
<b>Net Position</b>		
Invested in capital assets, net of related debt	24,971,694	25,326,196
Restricted for debt service	328,899	328,730
Unrestricted	4,130,020	3,607,539
Total net position	<u>29,430,613</u>	<u>29,262,465</u>
Total liabilities, deferred inflows of resources and net position	<u>\$ 38,177,275</u>	<u>\$ 38,442,975</u>

**Mount Sterling Water and Sewer Commission**  
**Statements of Revenues, Expenses And Changes in Net Position**  
**For the Years Ended June 30, 2019 and 2018**

<b>Operating revenues</b>	<b>2019</b>	<b>2018</b>
Water sales	\$ 3,373,069	\$ 3,279,452
Sewer sales	2,330,660	2,224,400
Other income	191,289	134,144
Total operating revenues	<u>5,895,018</u>	<u>5,637,996</u>
<b>Operating expenses</b>		
Water	2,406,958	2,398,577
Sewer	1,636,919	1,600,104
General and administrative costs:		
Water	1,138,946	1,182,132
Sewer	538,069	529,603
Total operating expenses	<u>5,720,892</u>	<u>5,710,416</u>
Operating income (deficit)	<u>174,126</u>	<u>(72,420)</u>
<b>Nonoperating revenues (expenses)</b>		
Interest income	26,170	13,529
Gain on sale of fixed assets	19,852	7,347
Other expense	(11,763)	(17,015)
Interest expense	(40,237)	(48,482)
Total net nonoperating revenues (expenses)	<u>(5,978)</u>	<u>(44,621)</u>
Income (deficit) before contributions	168,148	(117,041)
Capital contributions	<u>0</u>	<u>33,609</u>
Change in net position	168,148	(83,432)
Total net position, beginning of year	<u>29,262,465</u>	<u>29,345,897</u>
Total net position, end of year	<u>\$ 29,430,613</u>	<u>\$ 29,262,465</u>



**Mount Sterling Water and Sewer Commission**  
**Statements of Cash Flows**  
**For the Years Ended June 30, 2019 and 2018**

<b>Cash Flows from Operating Activities</b>	<b>2019</b>	<b>2018</b>
Cash received from customers	\$ 5,664,222	\$ 5,550,687
Other cash receipts	191,289	134,144
Cash payments to vendors for water services and supplies	(597,655)	(658,890)
Cash payments to vendors for sewer services and supplies	(348,538)	(331,924)
Cash payments to employees for services	(1,498,387)	(1,487,873)
Cash payments for water administrative costs	(716,503)	(727,679)
Cash payments for sewer administrative costs	(256,033)	(151,797)
<b>Net cash provided by operating activities</b>	<b>2,438,395</b>	<b>2,326,668</b>
<b>Cash Flows from Capital and Related Financing Activities</b>		
Acquisition and construction of capital assets	(968,621)	(639,503)
Proceeds from sale of assets	19,852	7,347
Interest paid on revenue bonds	(40,757)	(49,410)
Principal paid on debt	(624,355)	(864,798)
Increase in customer deposits	32,866	48,124
Other expense	(11,763)	(17,015)
<b>Net cash used in capital and related financing activities</b>	<b>(1,592,778)</b>	<b>(1,515,255)</b>
<b>Cash Flows from Investing Activities</b>		
Interest income from investments	17,241	11,723
<b>Net cash provided by investing activities</b>	<b>17,241</b>	<b>11,723</b>
<b>Net change in cash and cash equivalents</b>	<b>862,858</b>	<b>823,136</b>
Cash and cash equivalents, beginning of year	7,108,567	6,285,431
<b>Total cash and cash equivalents, end of year</b>	<b>\$ 7,971,425</b>	<b>\$ 7,108,567</b>
<b>Restricted cash and cash equivalents</b>	<b>\$ 715,929</b>	<b>\$ 685,102</b>
<b>Unrestricted cash and cash equivalents</b>	<b>7,255,496</b>	<b>6,423,465</b>
<b>Total cash and cash equivalents, end of year</b>	<b>\$ 7,971,425</b>	<b>\$ 7,108,567</b>

**Mount Sterling Water and Sewer Commission**  
**Statements of Cash Flows (continued)**  
**For the Years Ended June 30, 2019 and 2018**

<b>Reconciliation of operating income to net cash provided by operating activities:</b>	<b>2019</b>	<b>2018</b>
Operating income (deficit)	<u>\$ 174,126</u>	<u>\$ (72,420)</u>
Adjustments to reconcile operating income (deficit) to net cash provided by operating activities:		
Depreciation	1,947,478	1,898,823
Provision for bad debts	4,392	7,767
Change in assets and liabilities:		
(Increase) decrease in accounts receivable	(43,899)	39,068
Increase in inventories	(24,119)	(4,256)
(Increase) decrease in prepaids	(3,572)	17,409
Increase in accounts payable and accrued expenses	42,848	42,470
Increase in net pension obligation	<u>341,141</u>	<u>397,807</u>
Total adjustments	<u>2,264,269</u>	<u>2,399,088</u>
<b>Net cash provided by operating activities</b>	<u><u>\$ 2,438,395</u></u>	<u><u>\$ 2,326,668</u></u>

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
**June 30, 2019 and 2018**

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**Note 1. Summary of Significant Accounting Policies**

The accounting policies of the Mount Sterling Water and Sewer Commission (the Commission) conform to accounting principles generally accepted in the United States of America (GAAP). The Commission applies Financial Accounting Standards Board (FASB) pronouncements and Accounting Principles Board (APB) opinions issued on or before November 30, 1989, unless those pronouncements conflict with or contradict Governmental Accounting Standards Board (GASB) pronouncements, in which case, GASB prevails. The following is a summary of the more significant policies:

**Basis of accounting**

The Commission is an individual fund of the City of Mount Sterling, Kentucky and is accounted for as a governmental enterprise fund. It is financed and operated in a manner similar to a private business enterprise where the intent of the governing body is that costs (expenses, including depreciation) of providing goods or services to the general public on a continuing basis are financed primarily through user charges.

Accounts are maintained on the accrual basis of accounting. Under this method, revenues are recorded when earned and expenses are recorded at the time liabilities are incurred or prepaid amounts have been utilized.

**Investments**

Investments are carried at cost. Some of the investments are restricted as to use (Note 2). Funds of the Commission are required to be invested in accordance with the investment policy adopted by the Commission. The investment policy allows the Commission to invest in those instruments authorized by KRS 66.480. Bank deposits were substantially secured by FDIC insurance and collateral or invested in direct obligations of the United States at June 30, 2019 and 2018.

**Custodial credit risks – Deposits**

Custodial credit risk is the risk that in the event of a bank failure, the Commission's deposits may not be returned to it. The Commission does not have a deposit policy for custodial credit risk. As of June 30, 2019 \$6,680,801 of the Commission's bank balance of \$8,112,793 was exposed to custodial credit risk, as follows:

Insured	\$ 1,431,992
Collateral held by pledging bank's trust department in the Commission's name	<u>6,680,801</u>
Total bank deposits	<u>\$ 8,112,793</u>

**Accounts receivable**

Customer receivables are recorded as receivables and revenues at their original invoice amount. Management regularly reviews the customer receivable accounts and determines the allowance for doubtful accounts. A receivable is considered to be past due if any portion of the receivable balance is outstanding for more than 60 days. For the years ended June 30, 2019 and 2018, accounts receivable is stated less an allowance for doubtful accounts of \$160,555 and \$160,975, respectively. A schedule of allowance for doubtful accounts at June 30, 2019 and 2018, follows:

	<u>2019</u>	<u>2018</u>
Beginning balance	\$160,975	\$154,918
Provisions	4,392	7,767
Recoveries (Charge-offs)	<u>(4,812)</u>	<u>(1,710)</u>
Ending balance	<u>\$160,555</u>	<u>\$160,975</u>

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
**June 30, 2019 and 2018**

---

**Note 1. Summary of Significant Accounting Policies (Continued)**

**Inventories**

Inventories are stated at the lower of cost or market on the basis of "first-in, first-out" (FIFO) inventory method.

**Budgets**

In June of 2018, the Commission adopted the annual management budget in the amount of \$5,758,600 for the fiscal year ended June 30, 2019, detailed as follows:

Water	\$2,463,688
Sewer	1,687,097
General and administrative costs:	
Water	1,052,111
Sewer	<u>555,704</u>
Total operating expenses	<u>\$5,758,600</u>

**Property, plant and equipment**

Property, plant and equipment are stated at cost and depreciated over their estimated useful lives using the straight-line method. The range of useful lives used in computing depreciation is:

<u>Classification</u>	<u>Range of lives</u>
Buildings	20-40 years
Water plant	25-40 years
Water systems	10-30 years
Sewer system	10-40 years
Office equipment	7-10 years
Other equipment	7 years
Vehicles	5 years

Total depreciation expense was \$1,947,478 and \$1,898,823 for the years ended June 30, 2019 and 2018, respectively.

**Cash and cash equivalents**

All cash, unrestricted and restricted, is considered cash for the purposes of the statement of cash flows.

**Estimates**

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
**June 30, 2019 and 2018**

---

**Note 1. Summary of Significant Accounting Policies (Continued)**

**Capital and operating grants**

Grants that are restricted to the purchase of property, plant and equipment are recorded as other income, per GASB 33. The Commission received \$0 in grants of this type for the years ended June 30, 2019 and 2018.

Infrastructure assets constructed by outside entities then taken over by the Commission are also recorded as other income per GASB 33. The total amount of the assets taken over were \$0 and \$33,609 for the years ended June 30, 2019 and 2018. Such amounts would constitute noncash transactions.

**Capitalized interest**

The Commission follows the policy of capitalizing interest as a component of construction cost. For the year ended June 30, 2019, total interest cost incurred was \$40,237 of which \$0 was capitalized. For the year ended June 30, 2018, total interest cost incurred was \$48,482 of which \$0 was capitalized.

**Pensions**

For purposes of measuring the net pension liability and net OPEB liability, deferred outflows of resources and deferred inflows of resources related to pensions and OPEB, and pension and OPEB expense, information about the fiduciary net position of the County Employers' Retirement System Plan (CERS) and additions to/deductions from CERS' fiduciary net position have been determined on the same basis as they are reported by CERS. For this purpose, benefit payments, (including refunds of employee contributions) are recognized when due and payable in accordance with benefit terms. Investments are reported at fair value.

**Note 2. Restricted Assets**

The restricted assets in the accompanying financial statements are restricted as to use by ordinance (Note 5), external parties, or by board designation. A schedule of restricted assets at June 30, 2019, follows:

<u>Description</u>	<u>Cash</u>	<u>Investments at Cost</u>	<u>Total</u>
Assets restricted by grant agreement or bond ordinance:			
Customer deposits	\$ 387,030	\$ -0-	\$ 387,030
Reserve accounts	<u>328,899</u>	<u>-0-</u>	<u>328,899</u>
	<u>\$ 715,929</u>	<u>\$ -0-</u>	<u>\$ 715,929</u>

A schedule of restricted assets at June 30, 2018, follows:

<u>Description</u>	<u>Cash</u>	<u>Investments at Cost</u>	<u>Total</u>
Assets restricted by grant agreement or bond ordinance:			
Customer deposits	\$ 356,372	\$ -0-	\$ 356,372
Reserve accounts	<u>328,730</u>	<u>-0-</u>	<u>328,730</u>
	<u>\$ 685,102</u>	<u>\$ -0-</u>	<u>\$ 685,102</u>

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
**June 30, 2019 and 2018**

**Note 3. Long-Term Debt**

The Mount Sterling Water and Sewer Commission's bonded indebtedness and other long-term notes at June 30, 2019 and 2018, are summarized as follows:

	<u>Rate</u>	<u>Original Issue</u>	<u>2019</u>	<u>2018</u>
KIA Fund A Loan	1.00%	<u>\$13,202,540</u>	<u>\$ 3,216,927</u>	<u>\$ 3,841,282</u>
		<u>\$13,202,540</u>	3,216,927	3,841,282
Less current maturities			<u>(630,614)</u>	<u>(624,355)</u>
Total long term debt			<u>\$ 2,586,313</u>	<u>\$ 3,216,927</u>

- The original issue of the KIA Fund A Loan is \$13,202,540. As of June 30, 2019, the Commission had borrowed \$11,936,783 of this amount.

The Mount Sterling Water and Sewer Commission's bonded indebtedness and other long-term notes at June 30, 2019 and 2018, are detailed as follows:

	<u>Balance June 30 2017</u>	<u>Advances</u>	<u>Repayments</u>	<u>Balance June 30 2018</u>	<u>Advances</u>	<u>Repayments</u>	<u>Balance June 30 2019</u>
Kentucky Bond Corporation							
2010 Series C	\$ 105,000	\$0	\$ (105,000)	\$0	\$0	\$0	\$0
KIA Fund B	141,640	0	(141,640)	0	0	0	0
KIA Fund A Loan	4,459,440	0	(618,158)	3,841,282	0	(624,355)	3,216,927
Total	<u>\$ 4,706,080</u>	<u>\$0</u>	<u>\$ (864,798)</u>	<u>\$3,841,282</u>	<u>\$0</u>	<u>(\$624,355)</u>	<u>\$3,216,927</u>

	<u>Balance June 30, 2019</u>	
	<u>Current</u>	<u>Long-Term</u>
KIA Fund A Loan	<u>\$ 630,614</u>	<u>\$ 2,586,313</u>
Total	<u>\$ 630,614</u>	<u>\$ 2,586,313</u>

The long-term debt service requirements are as follows:

<u>Fiscal Year</u>	<u>Principal</u>	<u>Interest</u>	<u>Total</u>
2019-2020	\$ 630,614	\$ 30,597	\$ 661,211
2020-2021	636,936	24,275	661,211
2021-2022	643,321	17,890	661,211
2022-2023	649,771	11,440	661,211
2023-2024	<u>656,285</u>	<u>4,926</u>	<u>661,211</u>
	<u>\$ 3,216,927</u>	<u>\$ 89,128</u>	<u>\$ 3,306,055</u>

**Mount Sterling Water and Sewer Commission**  
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**Note 3. Long-Term Debt (Continued)**

**KIA Fund B**

As of June 30, 2019 and 2018, the Commission had also drawn on a KIA loan which was made to finance the construction of ground storage tanks and a water strengthening main. The loan was secured by a pledge of revenues, and had been drawn up to \$2,448,213. The loan bears an interest rate of 1.5% and had a life of 20 years and matured in 2018.

**Kentucky Infrastructure Authority - A02-01**

The Commission had drawn \$11,936,783 as of June 30, 2019 and 2018, from the Kentucky Infrastructure Authority. The loan was made for the construction of a new trunk sewer and wastewater treatment plant. The loan is secured by a pledge of revenues and can be drawn up to \$13,202,540. The loan bears an interest rate of 1% and has a life of 20 years.

**Kentucky Bond Corporation 2010 Series C Bonds**

On November 4, 2010, the Commission borrowed the aggregate principal amount of \$2,760,000 with the Kentucky Bond Corporation 2010 Series C Bonds. The purpose of the issue was for the refunding in advance of the obligations of the City of Danville, Kentucky designated as its Multi-City Lease Revenue Bonds (City of Mount Sterling, Kentucky Water and Sewer System Revenue Refunding & Improvement Project) Series 1998-B and the Kentucky Municipal League Pooled Lease Financing Program. The bonds were secured by a pledge of revenues. The bonds were subject to optional and mandatory redemption prior to maturity. The bonds matured in 2018.

**Note 4. Net Position**

GASB Statement No. 34 requires the delineation of Net Position as Invested in Property, Plant and Equipment (capital investments), Restricted and Unrestricted.

The balance of capital investments represents funds that have been used to acquire pump stations, storage facilities, meter stations, etc., constructed and operated by the Mount Sterling Water and Sewer Commission, net of outstanding debt. The balance was \$24,971,694 and \$25,326,196 at June 30, 2019 and 2018, respectively.

The Commission has the following restricted net assets that are reserved in accordance with the Commission's various bond ordinances (Note 5) or Board designations:

	<u>2019</u>	<u>2018</u>
Replacement	\$ 328,899	\$ 328,730
Total Restricted	<u>\$ 328,899</u>	<u>\$ 328,730</u>

The Commission has a balance of \$4,130,020 and \$3,607,539 for unrestricted net assets at June 30, 2019 and 2018, respectively.

**Mount Sterling Water and Sewer Commission**  
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**Note 5. Compliance with Bond Ordinance**

The Kentucky Infrastructure Authority requires the Commission to maintain certain reserves and restricted assets as follows:

**Replacement Reserve** - This reserve requires the Commission to deposit \$32,790 each December 1 into a separate account until the balance reaches \$327,900 and be maintained for the life of the loan. The total required balance of this reserve is \$327,900 for year ending June 30, 2019 and 2018. The balance of this reserve at June 30, 2019 and 2018, was \$328,899 and \$328,730, respectively.

**Note 6. Property, Plant and Equipment**

A summary of changes in property, plant and equipment is as follows:

	Balance June 30, 2017	Additions	Reclassifications and Disposals	Balance June 30, 2018	Additions	Reclassifications and Disposals	Balance June 30, 2019
Land and building	\$1,773,582	\$0	\$0	\$1,773,582	\$17,000	\$0	\$1,790,582
Water and sewer system	60,398,806	608,498	0	61,007,304	448,941	0	61,456,245
Equipment	1,413,901	147,702	(2,300)	1,559,303	73,832	(94,593)	1,538,542
Construction in progress	164,079	0	(164,079)	0	374,710	0	374,710
Vehicles	378,211	80,991	(34,775)	424,427	54,138	(29,192)	449,373
	64,128,579	837,191	(201,154)	64,764,616	968,621	(123,785)	65,609,452
Accumulated depreciation	(33,735,390)	(1,898,823)	37,075	(35,597,138)	(1,947,478)	123,785	(37,420,831)
Total net property, plant and equipment	\$30,393,189	(\$1,061,632)	(\$164,079)	\$29,167,478	(\$978,857)	\$0	\$28,188,621



**Mount Sterling Water and Sewer Commission**  
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**Note 7. Pension Plan**

Mount Sterling Water and Sewer Commission is a participating employer of the County Employees' Retirement System (CERS). Under the provisions of Kentucky Revised Statute Sections 61.645 and 61.701, the Board of Trustees of Kentucky Retirement Systems administers the CERS. The plan issues publicly available financial statements which may be downloaded from the Kentucky Retirement Systems website.

*Plan Description* – CERS is a cost-sharing multiple-employer defined benefit pension plan that covers substantially all regular full-time members employed in positions of each participating county, city, and school board, and any additional eligible local agencies electing to participate in the System. The plan provides for retirement, disability, and death benefits to plan members. Retirement benefits may be extended to beneficiaries of plan members under certain circumstances. Cost-of-living (COLA) adjustments are provided at the discretion of state legislature.

*Contributions* – For the year ended June 30, 2019, plan members were required to contribute 5.00% of wages for non-hazardous job classifications. Employees hired after September 1, 2008 are required to contribute an additional 1% to cover the cost of medical insurance that is provided through CERS. Participating employers were required to contribute at an actuarially determined rate. Per Kentucky Revised Statute Section 78.545(33), normal contribution and past service contribution rates shall be determined by the Board on the basis of an annual valuation last proceeding the July 1 of a new biennium. The Board may amend contribution rates as of the first day of July of the second year of a biennium, if it is determined on the basis of a subsequent actuarial valuation that amended contributions rates are necessary to satisfy requirements determined in accordance with actuarial basis adopted by the Board. For the year ended June 30, 2019, participating employers contributed 16.22% of each employee's wages to the pension fund, which is equal to the actuarially determined rate set by the Board. Administrative costs of Kentucky Retirement System are financed through employer contributions and investment earnings.

Plan members who began participating on, or after, January 1, 2014, were required to contribute to the Cash Balance Plan. The Cash Balance Plan is known as a hybrid plan because it has characteristics of both a defined benefit plan and a defined contribution plan. Members in the plan contribute a set percentage of their salary each month to their own account. Plan members contribute 5.00% of wages to their own account and 1% to the health insurance fund. The employer contribution rate is set annually by the Board based on an actuarial valuation. The employer contributes a set percentage of each member's salary. Each month, when employer contributions are received, an employer pay credit is deposited to the member's account. For non-hazardous members, their account is credited with a 4% employer pay credit. The employer pay credit represents a portion of the employer contribution.

The Commission contributed for the years ended June 30, 2019 and 2018 \$231,632 and \$195,811, respectively, or 100% of the required contribution to the pension fund.

*Pension Liabilities, Expense, Deferred Outflows of Resources and Deferred Inflows of Resources* – At June 30, 2019, the Commission reported a liability of \$3,329,935 for its proportionate share of the net pension liability. The net pension liability was measured as of June 30, 2018, and the total pension liability used to calculate the net pension liability was determined by an actuarial valuation as of June 30, 2017, rolled-forward from the valuation date to June 30, 2018 using generally accepted actuarial principles. The Commission's proportion of the net pension liability was determined using the Commission's actual contributions for the year ended June 30, 2018. This method is expected to be reflective of the Commission's long-term contribution effort. For the year ended June 30, 2019, the Commission's proportion was 0.054678 percent, which is equal to its proportion measured as of June 30, 2018.

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
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**Note 7. Pension Plan (continued)**

For the year ended June 30, 2019, the Commission recognized pension expense of \$527,641. At June 30, 2019, the Commission reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	<b>Deferred Outflows of Resources</b>	<b>Deferred Inflows of Resources</b>
Effects of changes of assumptions	\$ 325,432	\$ -
Commission contributions subsequent to the measurement date	231,632	-
Differences between projected and actual earnings on plan investments	-	39,928
Changes in proportion and differences between Commission contributions and proportionate share of contributions	10,924	51,280
Differences between expected and actual liability experience	<u>108,613</u>	<u>48,743</u>
<b>Total</b>	<b><u>\$ 676,601</u></b>	<b><u>\$ 139,951</u></b>

The \$231,632 of deferred outflows of resources resulting from the Commission's contributions subsequent to the measurement date will be recognized as a reduction of the net pension liability in the year ending June 30, 2020. Other amounts reported as deferred outflows of resources and deferred inflows of resources will be recognized in pension expense as follows:

2020	\$ 245,562
2021	116,415
2022	(39,087)
2023	(17,872)

**Actuarial Assumptions** – The total pension liability, net pension liability, and sensitivity information as of June 30, 2018 were based on an actuarial valuation date of June 30, 2017. The total pension liability was rolled-forward from the valuation date (June 30, 2017) to the plan's fiscal year ending June 30, 2018, using generally accepted actuarial principles. There have been no changes in actuarial assumptions since June 30, 2017. However, during the 2018 legislative session, House Bill 185 was enacted, which updated the benefit provisions for active members who die in the line of duty. Benefits paid to the spouses of deceased members have been increased from 25% of the member's final rate of pay to 75% of the member's average pay. If the member does not have a surviving spouse, benefits paid to surviving children have been increased from 10% of the member's final pay rate to 50% of the member's average pay for one child, 65% of average pay for two children, or 75% of average pay for three children. The total pension liability as of June 30, 2018 is determined using these updated benefit provisions. The actuarial assumptions used in the June 30, 2017 actuarial valuation are as follows:

Inflation	2.30%
Salary Increases	3.05%, average
Investment Rate of Return	6.25%

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
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**Note 7. Pension Plan (continued)**

The mortality table used for active members is RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females). For healthy retired members and beneficiaries, the mortality table used is the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set-back 1 year for females). For disabled members, the RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set-back 4 years for males) is used for the period after disability retirement. There is some margin in the current mortality tables for possible future improvement in mortality rates and that margin will be reviewed again when the next experience investigation is conducted.

Assumptions and funding policies are reviewed against actual plan experience at least once every five years through the completion of an actuarial experience study. The actuarial assumptions used in the June 30, 2018 valuation were based on the results of the most recent actuarial experience study for the period July 1, 2008 - June 30, 2013. The investment return, price inflation, and payroll growth assumptions were adopted by the Board in May and July 2017, for use with the June 30, 2018 valuation.

The target allocation and best estimates of arithmetic real rates of return for each major asset class at June 30, 2018 are summarized in the following table:

<b>Asset Class</b>	<b>Target Allocation</b>	<b>Long-term Expected Real Rate of Return</b>
US Equity Large Cap	5.00%	4.50%
US Equity Mid Cap	6.00%	4.50%
US Equity Small Cap	6.50%	5.50%
International Equity	12.50%	6.50%
Emerging Markets	5.00%	7.25%
Global Bonds	4.00%	3.00%
Global Credit	2.00%	3.75%
High Yield	7.00%	5.50%
Emerging Market Debt	5.00%	6.00%
Private Credit	10.00%	8.50%
Real Estate	5.00%	9.00%
Absolute Return	10.00%	5.00%
Real Return	10.00%	7.00%
Private Equity	10.00%	6.50%
Cash Equivalent	2.00%	1.50%
<b>Total</b>	<b>100.00%</b>	

*Discount Rate* – The discount rate used to measure the total pension liability was 6.25 percent at June 30, 2018. The projection of cash flows used to determine the discount rate assumed that local employers would contribute the actuarially determined contribution rate of projected compensation over the remaining 25 year amortization period of the unfunded actuarial accrued liability. The discount rate does not use a municipal bond rate.

**Mount Sterling Water and Sewer Commission**  
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**Note 7. Pension Plan (continued)**

*Sensitivity of the Commission's Proportionate Share of the Net Pension Liability to Changes in the Discount Rate* – The following presents the Commission's proportionate share of the net pension liability calculated using the discount rate of 6.25 percent, as well as what the Commission's proportionate share of the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (5.25 percent) or 1-percentage-point higher (7.25 percent) than the current rate:

	<b>Discount rate</b>	<b>Commission's proportionate share of net pension liability</b>
1% decrease	5.25%	\$ 4,192,022
Current discount rate	6.25%	\$ 3,329,935
1% increase	7.25%	\$ 2,607,626

*Payable to the Pension Plan* – At June 30, 2019 and 2018, the Commission reported a payable of \$21,522 and \$19,530, respectively, for the outstanding amount of contributions to the pension plan required for the year then ended. The payable only includes the pension portion of the contribution. Please refer to Note 8 for the amount due to the insurance fund.

**Note 8. Other Post Employment Benefit Plan**

Under the provisions of Kentucky Revised Statutes 61.645 and 61.701, the Board of Trustees of Kentucky Retirement Systems administers the Kentucky Employees Retirement System (KERS), County Employees Retirement System (CERS), and State Police Retirement System (SPRS). Mount Sterling Water and Sewer Commission is a participating employer of the CERS. The plan issues publicly available financial statements which may be downloaded from the Kentucky Retirement Systems website.

*Plan Description* – The Kentucky Retirement Systems' (KRS) Insurance Fund was established to provide hospital and medical insurance for eligible members receiving benefits from KERS, CERS, and SPRS. Although the assets of the systems are invested as a whole, each system's assets are used only for the payment of benefits to the members of that plan and the administrative costs incurred by those receiving an insurance benefit.

The CERS Non-hazardous Insurance Fund is a cost-sharing multiple-employer defined benefit Other Postemployment Benefits (OPEB) plan that covers substantially all regular full-time members employed in positions of each participating county, city, and school board, and any additional eligible local agencies electing to participate in the System. The plan provides for health insurance benefits to plan members. OPEB may be extended to beneficiaries of plan members under certain circumstances.

Membership in the CERS Non-hazardous Insurance Fund consisted of the following at June 30, 2017, the date of the latest actuarial valuation:

**Membership Status**

Inactive plan members currently receiving benefits:	33,481
Inactive plan members entitled to but not yet receiving benefits:	8,230
Active plan members:	<u>81,891</u>
Total plan members:	<u>123,602</u>

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
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**Note 8. Other Post Employment Benefit Plan (continued)**

*Actuarial Assumptions* – The total OPEB liability, net OPEB liability, and sensitivity information as of June 30, 2018, were based on an actuarial valuation date of June 30, 2017. The total OPEB liability was rolled-forward from the valuation date (June 30, 2017) to the plan's fiscal year ending June 30, 2018, using generally accepted actuarial principles. There have been no changes in actuarial assumptions since June 30, 2017 (other than the blended discount rate used to calculate the total OPEB liability). However, during the 2018 legislative session, House Bill 185 was enacted, which updated the benefit provisions for active members who die in the line of duty. The system shall now pay 100% of the insurance premium for spouses and children of all active members who die in the line of duty. The total OPEB liability as of June 30, 2018, is determined using these updated benefit provisions. The actuarial assumptions used in the June 30, 2017 actuarial valuation are as follows:

Inflation	2.30%
Payroll Growth Rate	2.00%, CERS non-hazardous
Salary Increase	3.05%, average
Investment Rate of Return	6.25%
Healthcare Trend Rates	
Pre – 65	Initial trend starting at 7.00% at January 1, 2020, and gradually decreasing to an ultimate trend rate of 4.05% over a period of 12 years.
Post – 65	Initial trend starting at 5.00% at January 1, 2020, and gradually decreasing to an ultimate trend rate of 4.05% over a period of 10 years.

The mortality table used for active members is RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females). For healthy retired members and beneficiaries, the mortality table used is the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set back one year for females). For disabled members, the RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set back four years for males) is used for the period after disability retirement.

Assumptions and funding policies are reviewed against actual plan experience at least once every five years through the completion of an actuarial experience study. The actuarial assumptions used in the June 30, 2018 valuation were based on the results of the most recent actuarial experience study for the period July 1, 2008 - June 30, 2013. The investment return, price inflation, and payroll growth assumptions were adopted by the Board in May and July 2017, for use with the June 30, 2017 valuation in order to reflect future economic expectations.

*Discount Rate* – The single discount rate of 5.85% for CERS Non-hazardous is based on the long-term expected rate of return on OPEB plan investments of 6.25% and a long-term municipal bond rate of 3.62% as reported in Fidelity Index's "20-Year Municipal GO AA Index" as of June 30, 2018. The projection of cash flows used to determine the discount rate assumed that local employers would contribute the actuarially determined contribution rate of projected compensation over the remaining 25-year amortization period of the unfunded actuarial accrued liability.

**Mount Sterling Water and Sewer Commission**  
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**Note 8. Other Post Employment Benefit Plan (continued)**

The target allocation and best estimates of arithmetic real rates of return for each major asset class at June 30, 2018 are summarized in the following table:

<b>Asset Class</b>	<b>Target Allocation</b>	<b>Long-term Expected Real Rate of Return</b>
US Equity Large Cap	5.00%	4.50%
US Equity Mid Cap	6.00%	4.50%
US Equity Small Cap	6.50%	5.50%
International Equity	12.50%	6.50%
Emerging Markets	5.00%	7.25%
Global Bonds	4.00%	3.00%
Global Credit	2.00%	3.75%
High Yield	7.00%	5.50%
Emerging Market Debt	5.00%	6.00%
Private Credit	10.00%	8.50%
Real Estate	5.00%	9.00%
Absolute Return	10.00%	5.00%
Real Return	10.00%	7.00%
Private Equity	10.00%	6.50%
Cash Equivalent	2.00%	1.50%
<b>Total</b>	<b>100.00%</b>	

*Implicit Subsidy* - The fully-insured premiums KRS pays for the Kentucky Employees' Health Plan are blended rates based on the combined experience of active and retired members. Since the average cost of providing health care benefits to retirees under age 65 is higher than the average cost of providing health care benefits to active employees, there is an implicit employer subsidy for non-Medicare eligible retirees. Participating employers should adjust their contributions by the implicit subsidy in order to determine the total employer contribution for GASB Statement No. 75 purposes. This adjustment is needed for contributions made during the measurement period and for the purpose of deferred outflows related to contributions made after the measurement date. Mount Sterling Water and Sewer Commission's implicit subsidy for the years ended June 30, 2019 and 2018 was \$15,661 and \$13,453 respectively.

*Contributions* - Participating employers are required to contribute at an actuarially determined rate. Per Kentucky Revised Statute Section 78.545(33), normal contribution and past service contribution rates shall be determined by the Board on the basis of an annual valuation last preceding July 1 of a new biennium. The Board may amend contribution rates as of the first day of July of the second year of a biennium, if it is determined on the basis of a subsequent actuarial valuation that amended contributions rates are necessary to satisfy requirements determined in accordance with actuarial bases adopted by the Board.

For the fiscal year ended June 30, 2019, participating employers contributed 5.26% of each employee's covered payroll to the Kentucky Retirement Systems' Insurance Fund, which is equal to the actuarially determined rate set by the Board. Administrative costs of Kentucky Retirement Systems are financed through employer contributions and investment earnings.

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
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**Note 8. Other Post Employment Benefit Plan (continued)**

Employees hired after September 1, 2008 are required to contribute an additional 1% of their covered payroll to the insurance fund. Contributions are deposited to an account created for the payment of health insurance benefits under 26 USC Section 401(h). These members are classified in the Tier 2/Tier 3 structure of benefits and the 1% contribution to the 401(h) account is non-refundable.

Mount Sterling Water and Sewer Commission contributed for the years ended June 30, 2019 and 2018, \$75,116 and \$63,557, respectively, or 100% of the required contribution to the insurance fund. Total contributions to the insurance fund, including the implicit subsidy for the years ended June 30, 2019 and 2018, were \$90,777 and \$77,010, respectively. For additional information regarding contributions, please refer to Note 7.

*OPEB Liabilities, Expense, Deferred Outflows of Resources and Deferred Inflows of Resources*—At June 30, 2019, the Commission reported a liability of \$970,797 for its proportionate share of the net OPEB liability. The net OPEB liability was measured as of June 30, 2018, and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of June 30, 2017, rolled-forward to June 30, 2018 using generally accepted actuarial principles. The Commission's proportion of the net OPEB liability was determined using the Commission's actual contributions for the year ended June 30, 2018. This method is expected to be reflective of the Commission's long-term contribution effort. For the year ended June 30, 2019, the Commission's proportion was 0.05467857 percent, which is equal to its proportion measured as of June 30, 2018.

For the year ended June 30, 2019, the Commission recognized OPEB expense of \$122,456. At June 30, 2019, the District reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Effects of changes of assumptions	\$ 193,883	\$ 2,243
Commission contributions subsequent to the measurement date (including implicit subsidy)	90,777	-
Differences between projected and actual earnings on plan investments	-	66,869
Differences between expected and actual liability experience	-	113,134
Changes in proportion and differences between Commission contributions and proportionate share of contributions	-	6,905
Total	<u>\$ 284,660</u>	<u>\$ 189,151</u>

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
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**Note 8. Other Post Employment Benefit Plan (continued)**

The \$90,777 of deferred outflows of resources resulting from the Commission's contributions subsequent to the measurement date and June 30, 2019 implicit subsidy will be recognized as a reduction of the net OPEB liability in the year ending June 30, 2020. Other amounts reported as deferred outflows of resources and deferred inflows of resources will be recognized in OPEB expense as follows:

Year ending June 30,	
2020	\$ 2,059
2021	2,059
2022	2,059
2023	15,046
2024	(9,828)
Thereafter	(6,663)

*Sensitivity of the Commission's Proportionate Share of the Net OPEB Liability to Changes in the Discount Rate* – The following presents the Commission's proportionate share of the net OPEB liability calculated using the single discount rate of 5.85 percent, as well as what the Commission's proportionate share of the net OPEB liability would be if it were calculated using a discount rate that is 1-percentage-point lower (4.85 percent) or 1-percentage-point higher (6.85 percent) than the current rate.

	Discount rate	Commission's proportionate share of net OPEB liability
1% decrease	4.85%	\$ 1,260,923
Current discount rate	5.85%	\$ 970,797
1% increase	6.85%	\$ 723,682

*Sensitivity of the Commission's Proportionate Share of the Net OPEB Liability to Changes in the Healthcare Cost Trend Rate* – The following presents the Commission's proportionate share of the net OPEB liability calculated using the current healthcare cost trend rates (see details in *Actuarial Assumptions* above), as well as what the Commission's proportionate share of the net OPEB liability would be if it were calculated using healthcare cost trend rates that are 1 percentage point lower or 1 percentage point higher than the current rates.

	Commission's proportionate share of net OPEB liability
1% decrease	\$ 722,768
Current healthcare cost trend rate	\$ 970,797
1% increase	\$ 1,263,152

*Payable to the OPEB Plan* – At June 30, 2019 and 2018, the Commission reported a payable of \$6,980 and \$6,339, respectively, for the outstanding amount of contributions to the insurance plan required for the years then ended. The payable only includes the insurance portion of the contribution. Please refer to Note 7 for the amount due to the pension plan.



**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
**June 30, 2019 and 2018**

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**Note 9. Restatement of Net Position**

During 2018 the Commission implemented GASB Statement No. 75, Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions, which addresses financial reporting for state and local government employers whose employees are provided with postemployment benefits other than pensions. Statement No. 75, replaces the requirements of Statement No. 45, Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pensions, as amended.

The guidance contained in Statement 75 changed how governments calculate and report the costs and obligations associated with postemployment benefits other than pensions (OPEB). Under the new standards GASB requires that cost-sharing governments report a net OPEB liability, OPEB expense, and OPEB related deferred inflows and outflows of resources based on their proportionate share of the collective amounts for all the governments in the plan. In addition, GASB requires Statement 75 to be applied retroactively. This accounting change, results in the following changes to previously-reported beginning amounts for 2018:

	<b>Net Position</b>
Net position, at July 1, 2017, as originally reported	\$ 29,714,831
Beginning net OPEB liability and deferred outflows	<u>(793,238)</u>
Net position, at July 1, 2017, as restated	28,921,593
Correction of deferred inflows	(6,907)
Change in net position, as previously reported	<u>431,211</u>
Balances, at June 30, 2017, as restated	<u>\$ 29,345,897</u>

**Note 10. Risk Management**

The Mount Sterling Water and Sewer Commission is exposed to various risks of loss related to torts; theft of, damage to, and destruction of assets; errors and omissions; injuries to employees; and natural disasters. In addition to its general liability insurance, the Commission also carries commercial insurance for all other risks of loss such as workers' compensation and employee health and accident insurance. Settled claims resulting from these risks have not exceeded commercial insurance coverage in any of the past three fiscal years. The following is a schedule of insurance in force as of June 30, 2019:

<u>Coverage</u>	<u>Amount of Coverage</u>	<u>Premium</u>	<u>Policy Term</u>
Buildings & property	\$ 32,784,894	*	7/1/18 - 7/1/19
General liability	6,000,000	*	7/1/18 - 7/1/19
Employment Practices	3,000,000	*	7/1/18 - 7/1/19
Public officials liability	3,000,000	*	7/1/18 - 7/1/19
Cyber and Automobile liability (ea)	6,000,000	*	7/1/18 - 7/1/19
Automobile physical	Actual Value	*	7/1/18 - 7/1/19
Crime: Employee dishonesty	250,000	*	7/1/18 - 7/1/19
Workers compensation insurance:			
Waterworks	766,205	*	7/1/18 - 7/1/19
Sewage	304,588	*	7/1/18 - 7/1/19
Clerical	310,769	*	7/1/18 - 7/1/19
Health & life insurance	Various	\$ 335,398	Monthly

\*Blanket coverage; total premium \$99,890.

**Mount Sterling Water and Sewer Commission**  
**Notes to the Financial Statements**  
**June 30, 2019 and 2018**

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**Note 11. Subsequent Events**

Subsequent events for Mount Sterling Water and Sewer Commission have been evaluated through September 10, 2019, which is the date the financial statements were available to be issued.

Mount Sterling Water and Sewer Commission is in the planning and design phase for a Wastewater Treatment Plant expansion project. The Commission has signed an engineering and design contract estimated to cost in excess of \$400,000. However, the completed project cost is not certain at this time.

**Mount Sterling Water and Sewer Commission**  
**Schedule of Revenues, Expenses And Changes**  
**in Net Assets Budget and Actual**  
**For the Year Ended June 30, 2019**

	Enacted Budget	Actual	Favorable (Unfavorable)
<b>Operating revenues</b>			
Water sales	\$ 3,442,753	\$ 3,373,069	\$ (69,684)
Sewer sales	2,320,454	2,330,660	10,206
Other income	136,951	191,289	54,338
Total operating revenues	<u>5,900,158</u>	<u>5,895,018</u>	<u>(5,140)</u>
<b>Operating expenses</b>			
Water	2,463,688	2,406,958	56,730
Sewer	1,687,097	1,636,919	50,178
General and administrative costs:			
Water	1,025,240	1,138,946	(113,706)
Sewer	528,833	538,069	(9,236)
Total operating expenses	<u>5,704,858</u>	<u>5,720,892</u>	<u>(16,034)</u>
Operating income	<u>195,300</u>	<u>174,126</u>	<u>(21,174)</u>
<b>Nonoperating revenues (expenses)</b>			
Interest income	9,211	26,170	16,959
Gain on sale of fixed assets	0	19,852	19,852
Other expense	(16,882)	(11,763)	5,119
Interest expense	<u>(36,860)</u>	<u>(40,237)</u>	<u>(3,377)</u>
Total net nonoperating revenues (expenses)	<u>(44,531)</u>	<u>(5,978)</u>	<u>38,553</u>
Income before contributions	150,769	168,148	17,379
Capital contributions	<u>0</u>	<u>0</u>	<u>0</u>
Change in net assets	150,769	168,148	17,379
Total net assets, beginning of year	<u>29,262,465</u>	<u>29,262,465</u>	<u>0</u>
Total net assets, end of year	<u>\$ 29,413,234</u>	<u>\$ 29,430,613</u>	<u>\$ 17,379</u>

**Mount Sterling Water and Sewer Commission  
Schedule of Debt Service Requirements  
Kentucky Infrastructure Authority A02-01  
June 30, 2019**

<b>Fiscal Year Ending June 30</b>	<b>Principal Due Dec. 1 &amp; June 1</b>	<b>Interest Due Dec. 1 &amp; June 1</b>	<b>Admin. Fees</b>	<b>Total Debt Requirements</b>	<b>Principal Outstanding at End of Year</b>
2020	\$ 630,614	\$ 30,597	\$ 6,119	\$ 667,330	\$ 2,586,313
2021	636,936	24,275	4,855	666,066	1,949,377
2022	643,322	17,890	3,578	664,790	1,306,055
2023	649,770	11,440	2,288	663,498	656,285
2024	656,285	4,926	985	662,196	0
	<u>\$ 3,216,927</u>	<u>\$ 89,128</u>	<u>\$ 17,825</u>	<u>\$ 3,323,880</u>	

**Mount Sterling Water and Sewer Commission**  
**Schedule of Proportionate Share of the Net Pension Liability**  
**As of and for the year ended June 30, 2019**

	2019	2018	2017	2016	2015	2014
Commission's proportion of the net pension liability						
Commission's proportionate share of the net pension liability (asset)	0.054678%	0.054756%	0.057564%	0.055168%	0.054759%	0.054759%
Commission's covered employee payroll	\$ 3,329,935	\$ 3,205,037	\$ 2,834,255	\$ 2,371,971	\$ 1,781,540	\$ 2,010,266
Commission's share of the net pension liability (asset) as a percentage of its covered employee payroll	\$ 1,428,063	\$ 1,352,285	\$ 1,338,593	\$ 1,373,209	\$ 1,287,153	\$ 1,256,270
Plan fiduciary net position as a percentage of the total pension liability	233.18%	237.01%	211.73%	172.73%	138.41%	160.02%
	53.54%	53.32%	55.50%	59.97%	66.80%	61.22%

**Notes:**

Schedule is intended to show information for the last 10 fiscal years. Additional years will be displayed as they become available.

- \* The amounts presented for each fiscal year were determined (measured) as of the previous fiscal year.

**Mount Sterling Water and Sewer Commission**  
**Schedule of Pension Contributions**  
**As of and for the year ended June 30, 2019**

	2019	2018	2017	2016	2015	2014	2013
Contractually required employer contribution	\$ 231,632	\$ 195,811	\$ 186,618	\$ 170,553	\$ 164,134	\$ 172,611	\$ 158,114
Contributions relative to contractually required employer contribution	\$ 231,632	\$ 195,811	\$ 186,618	\$ 170,553	\$ 164,134	\$ 172,611	\$ 158,114
Contribution deficiency (excess)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Company's covered employee payroll	\$ 1,428,063	\$ 1,352,285	\$ 1,338,593	\$ 1,373,209	\$ 1,287,153	\$ 1,256,270	\$ 1,252,885
Employer contributions as a percentage of covered-employee payroll	16.22%	14.48%	13.94%	12.42%	12.75%	13.74%	12.62%

**Notes:**

Schedule is intended to show information for the last 10 fiscal years. Additional years will be displayed as they become available.

Contractually required employer contributions exclude the portion of contributions paid to CERS but allocated to the insurance fund of the CERS. The above contributions only include those contributions allocated directly to the CERS pension fund.

**Mount Sterling Water and Sewer Commission**  
**Schedule of Proportionate Share of the Net OPEB Liability**  
**As of and for the year ended June 30, 2019**

	2019	2018	2017
Commission's proportion of the net OPEB liability	0.054678%	0.054756%	0.054756%
Commission's proportionate share of the net OPEB liability (asset)	\$ 970,797	\$ 1,100,783	\$ 863,421
Commission's covered employee payroll	\$ 1,428,063	\$ 1,352,285	\$ 1,338,593
Commission's share of the net OPEB liability (asset) as a percentage of its covered employee payroll	67.98%	81.40%	64.50%
Plan fiduciary net position as a percentage of the total OPEB liability	57.62%	52.40%	55.24%

**Notes:**

Schedule is intended to show information for the last 10 fiscal years.

Additional years will be displayed as they become available.

- \* The amounts presented for each fiscal year were determined (measured) as of the previous fiscal year.

**Mount Sterling Water and Sewer Commission**  
**Schedule of OPEB Contributions**  
**As of and for the year ended June 30, 2019**

	2019	2018	2017
Contractually required employer contribution	\$ 75,116	\$ 63,557	\$ 63,277
Contributions relative to contractually required employer contribution	<u>\$ 75,116</u>	<u>\$ 63,557</u>	<u>\$ 63,277</u>
Contribution deficiency (excess)	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
Company's covered employee payroll	\$ 1,428,063	\$ 1,352,285	\$ 1,338,593
Employer contributions as a percentage of covered-employee payroll	5.26%	4.70%	4.73%

**Notes:**

Schedule is intended to show information for the last 10 fiscal years.  
Additional years will be displayed as they become available.

Contractually required employer contributions exclude the portion of contributions paid to CERS but allocated to the pension fund of the CERS. The above contributions only include those contributions allocated directly to the CERS insurance fund.



**Mount Sterling Water and Sewer Commission  
Schedule of Changes in Benefits and Assumptions  
As of and for the year ended June 30, 2019**

**County Employee Retirement System - Pension & Insurance Funds**

*Changes of benefit terms*

During the **2018** legislative session, House Bill 185 was enacted, which updated the benefit provisions for active members who die in the line of duty.

- Pension - Benefits paid to the spouses of deceased members have been increased from 25% of the member's final rate of pay to 75% of the member's average pay. If the member does not have a surviving spouse, benefits paid to surviving dependent children have been increased from 10% of the member's final pay rate to 50% of average pay for one child, 65% of average pay for two children, or 75% of average pay for three children.
- Insurance - The system shall now pay 100% of the insurance premium for spouses and children of all active members who die in the line of duty.

*Changes in assumptions*

The following changes were adopted by the Board of Trustees and reflected in the valuation performed as of **June 30, 2017**:

- The assumed investment rate of return was decreased from 7.50% to 6.25%.
- The assumed rate of inflation was reduced from 3.25% to 2.30%.
- The payroll growth assumption was reduced from 4.00% to 2.00%.
- The salary increase assumption was reduced from 4.00% average to 3.05% average.

The following changes were adopted by the Board of Trustees and reflected in the valuation performed as of **June 30, 2015**:

- The assumed investment rate of return was decreased from 7.75% to 7.50%.
- The assumed rate of inflation was reduced from 3.50% to 3.25%.
- The assumed rate of wage inflation was reduced from 1% to 0.75%.
- The payroll growth assumption was reduced from 4.50% to 4.00%.
- The mortality table used for active members is RP-2000 Combined Mortality Table projected with Scale BB 2013 (multiplied by 50% for males and 30% for females).

**Mount Sterling Water and Sewer Commission**  
**Schedule of Changes in Benefits and Assumptions (continued)**  
**As of and for the year ended June 30, 2019**

**County Employee Retirement System - Pension & Insurance Funds**

*Changes in assumptions (continued)*

The following changes were adopted by the Board of Trustees and reflected in the performed as of **June 30, 2015 (continued)**:

- For healthy retired members and beneficiaries, the mortality table used is the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set-back one year for females). For disabled the RP-2000 Combined Disabled Mortality Table projected with BB to 2013 (set-back four years for males) is used for the period after disability retirement. There is some margin in the current mortality tables for possible future improvement in mortality rates that margin will be reviewed again when the next experience investigation is conducted.
- Assumed rates of retirement, withdrawal, and disability were to more accurately reflect experience.

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**INDEPENDENT AUDITOR'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING AND  
ON COMPLIANCE AND OTHER MATTERS BASED ON AN AUDIT OF FINANCIAL STATEMENTS  
PERFORMED IN ACCORDANCE WITH GOVERNMENT AUDITING STANDARDS**

Mount Sterling Water and Sewer Commission  
Mount Sterling, Kentucky

We have audited, in accordance with the auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the financial statements of the business-type activities of Mount Sterling Water and Sewer Commission (the Commission) of the City of Mount Sterling, Kentucky, as of and for the year ended June 30, 2019, and the related notes to the financial statements, which collectively comprise the Commission's basic financial statements and have issued our report, which includes an explanatory paragraph regarding the omission of Management Discussion and Analysis, thereon dated September 10, 2019.

**Internal Control Over Financial Reporting**

In planning and performing our audit of the financial statements, we considered the Commission's internal control over financial reporting (internal control) to determine the audit procedures that are appropriate in the circumstances for the purpose of expressing our opinions on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the Commission's internal control. Accordingly, we do not express an opinion on the effectiveness of the Commission's internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies and therefore, material weaknesses or significant deficiencies may exist that were not identified. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified. We did identify a certain deficiency in internal control, described below that we consider to be a significant deficiency.

**Finding: 2019-1**

- Condition: While management is knowledgeable in regard to the numbers reported in the financial statements, identifying and applying new authoritative guidance in regard to information reported in the notes to those statements is outside the scope of management's training and experience.
- Management Response and Corrective Action Plan: It does not appear that it would be economically feasible for our organization to enlarge its staff or contract an individual with appropriate skill and knowledge in applying new authoritative guidance. Thus, it is important that our Board provide oversight and independent review functions.

### **Compliance and Other Matters**

As part of obtaining reasonable assurance about whether the Commission's financial statements are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

### **Response to Findings**

The Commission's response to the findings identified in our audit is described in this report. The Commission's response was not subjected to the auditing procedures applied in the audit of the financial statements and, accordingly, we express no opinion on it.

### **Purpose of this Report**

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the entity's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

*Faulkner, King & Wenz, PSC*

September 10, 2019